

RADIOECOLOGICAL SENSITIVITY OF THE COASTAL MARINE REGIONS

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An evaluation of the radioecological sensitivity of the coastal marine regions can be used to improve risk management and decision-making systems, especially the development of response strategies, by defining the most sensitive areas. Modelling of the radioecological sensitivity after the release of radionuclides into the marine environment has to include different aspects: (i) dispersion of radionuclides in water and sediment phases, (ii) bioaccumulation of radionuclides in biota and (iii) dose assessments for marine organisms and human populations. The present results are for a single deposition of 1000 Bq/m² for radionuclides ¹³⁷Cs, ⁹⁰Sr, ¹³¹I and ²³⁹Pu for all marine regions. The radionuclide concentrations have been calculated for seawater (filtered and unfiltered), fish, molluscs, crustaceans and seaweeds. The radiation doses, during the 1st year, 2nd year and 10th year after releases of radionuclides, have been calculated for adults and children of 1 and 10 years of age. Finally, the doses to biota are calculated on the basis of radionuclide concentrations in marine organisms, water and sediment and dose conversion factors. The calculations have been carried out on the basis of the NRPA compartment model. The compartment structures for surface, mid-depth and deep water layers have been developed based on the description of polar, Atlantic and deep waters in the Arctic Ocean and the Northern Seas and site-specific information for the compartments. The model includes the processes of advection of radioactivity between compartments, sedimentation, diffusion of radioactivity through pore water in sediments, resuspension, particle mixing including mixing due to bioturbation and a burial process of radioactivity in deep sediment layers. Radioactive decay is calculated for all compartments. The contamination of marine organisms is further calculated from the radionuclide concentrations in filtered seawater in the different water regions. Doses to man are calculated on the basis of seafood consumption. Results show the differences of radioecological sensitivity between different marine regions for different radionuclides and points of interest.